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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/809,842

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Yoshinori Kida

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KUBOVCIK & KUBOVCIK

SUITE 1105

1215 SOUTH CLARK STREET

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EXAMINER

DOVE, TRACY MAE

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

04/07/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/809,842	Applicant(s) KIDA ET AL.	
	Examiner TRACY DOVE	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the communication filed on 1/17/08. Applicant's arguments have been considered, but are not persuasive. Claims 1 and 17 are pending.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/17/08 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatazaki et al., US 2001/0038949.

Hatazaki teaches a non-aqueous secondary battery having excellent charge/discharge characteristics and a long cycle life comprising a positive electrode, a negative electrode and a non-aqueous electrolyte including a non-aqueous solvent and a solute (abstract). The negative electrode includes a carbon active material (0057-0059). The solvent may consist of 80% of γ -butyrolactone (0011). It is preferable that at least one selected from the group consisting of a carbonic acid ester type additive and a sulfur compound type additive is further added to the non-

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aqueous electrolyte (0012-0014). The amount of carbonic acid ester additive and/or sulfur compound additive is preferably 0.1-10 parts by weight per 100 parts by weight of the non-aqueous electrolyte (0049). In the case where the carbonic acid ester type additive and the sulfur compound type additive are used at the same time, preferable ratio of carbonic acid ester to sulfur compound is 1:9 to 9:1 (0050). The carbonic acid ester additive may be vinylene carbonate and/or vinylethylene carbonate. Vinylene carbonate is a particularly preferred carbonic acid ester additive (0047). Sulfolane is a preferred sulfur compound additive (0048).

Hatazaki does not explicitly state sulfolane is contained in an amount of 20-45 % by volume based on the total volume of the solvent. However, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because claims that differ from the prior art only by slightly different (non-overlapping) ranges are prima facie obvious without a showing that the claimed range achieves unexpected results relative to the prior art. See *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685 (Fed. Cir. 1996). Claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art.

Furthermore, the courts have ruled where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 CCPA 1250, 156 F.2d 239, 70 USPQ 412. The courts have held that a limitation merely with respect to proportions in a composition of matter or process will not support patentability unless such limitation is “critical”. *Minerals Separation, Ltd. v. Hyde*, 242 U.S. 261 (1916).

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In addition, it is unclear if Hatazaki teaches the added limitation of sulfolane “in an amount of 20-45 % by volume, on the basis of the total volume of the solvent” because Hatazaki does not teach the amount of sulfolane based on the volume percentage of only the solvent. Hatazaki teaches the amount of sulfolane based on the weight percentage of the entire electrolyte (not just the solvent).

*

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hatazaki et al., US 2001/0038949 in view of Kameda et al., US 6,632,569.

Hatazaki teaches a non-aqueous secondary battery having excellent charge/discharge characteristics and a long cycle life comprising a positive electrode, a negative electrode and a non-aqueous electrolyte including a non-aqueous solvent and a solute (abstract). The negative electrode includes a carbon active material (0057-0059). The solvent may consist of 80% of γ -butyrolactone (0011). It is preferable that at least one selected from the group consisting of a carbonic acid ester type additive and a sulfur compound type additive is further added to the non-aqueous electrolyte (0012-0014). The amount of carbonic acid ester additive and/or sulfur compound additive is preferably 0.1-10 parts by weight per 100 parts by weight of the non-aqueous electrolyte (0049). In the case where the carbonic acid ester type additive and the sulfur compound type additive are used at the same time, preferable ratio of carbonic acid ester to sulfur compound is 1:9 to 9:1 (0050). The carbonic acid ester additive may be vinylene carbonate and/or vinylethylene carbonate. Vinylene carbonate is a particularly preferred carbonic acid ester additive (0047). Sulfolane is a preferred sulfur compound additive (0048).

Hatazaki is silent regarding the intensity ratio of the carbon material of the negative electrode.

However, Kameda teaches a non-aqueous solvent secondary battery comprising a carbon negative electrode active material. The carbon material has a plane space d002 of a (002) plane less than 0.337 nm, a crystallite size (Lc) of 90 nm or higher and an R value, as a peak intensity ratio of a peak intensity of 1360 cm^{-1} to a peak intensity of 1580 cm^{-1} in a Raman spectrum of 0.20 or higher (abstract).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the carbon material of Kameda for the carbon material of Hatazaki. Both Kameda and Hatazaki are directed toward non-aqueous solvent electrolyte secondary batteries having carbon negative electrode active material. One of skill would have been motivated to substitute the carbon material of Kameda for the carbon material of Hatazaki in order to improve the battery capacity, prevent irreversible capacity admitted in the initial battery cycle and improve quick charging and discharging characteristics (abstract of Kameda).

Response to Arguments

Applicant's arguments filed 1/17/08 have been fully considered but they are not persuasive. Regarding Hatazaki, Applicant asserts a person of ordinary skill in the art would not have been motivated to modify the battery of Hatazaki to increase the amount of sulfolane to an amount of more than 10 parts by weight because Hatazaki teaches away from the use of an amount of additive (sulfolane) of more than 10 parts by weight. Applicant points to paragraph [0049] that teaches if the amount were more than 10 parts by weight, the coating film formed on

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the electrode becomes too thick, thereby deteriorating the discharge characteristics. However, this only teaches away from the claimed invention if the same deteriorating discharge characteristics do not result. If the claimed invention and Hatazaki have identical teachings except for the amount of sulfolane, it is unclear how the same amount of sulfolane additive would have a deteriorating effect in Hatazaki, but not in the claimed invention.

Applicant states the claimed amount of sulfolane based on the total volume of solvent is significantly greater than the upper limit of 10 parts by weight of sulfolane per 100 parts by weight of the electrolyte described in Hatazaki. However, parts by weight per parts by weight of the electrolyte (salt and solvent) is not equivalent to a volume percent based on the volume of solvent (only part of the electrolyte). Since the calculations regarding the examples are based on this assertion, the calculations are considered flawed and are not found persuasive. For example if the only solvent in the electrolyte is sulfolane, then sulfolane is 100 vol% of the solvent. However, since the electrolyte contains other components, such as salts, the sulfolane is not 100 vol% of the electrolyte.

If Applicant wishes to further discuss the calculations, please contact the Examiner directly. It is apparent to the Examiner that Applicant strongly believes the calculations are not flawed, but the Examiner does not understand how Applicant reaches this conclusion. Examiner points out that even if the calculations are found persuasive, they only show a different amount of sulfolane and do not show any unexpected results. The courts have held that a limitation merely with respect to proportions will not support patentability in the absence of unexpected results. Hatazaki discloses a battery having excellent charge/discharge characteristics and a long cycle life while generating a smaller amount of gas during storage than conventional batteries

(abstract). An object of the present specification is to improve the charge and discharge characteristics of a battery (0008). Applicant has not provided evidence of unexpected results that would distinguish the assertion that Hatazaki teaches at most 10 vol% of sulfolane and the claimed invention reciting at least 20 vol% of sulfolane.

Applicant refers to [0049] of Hatakai that discusses a coating film being formed on the electrode. Examiner points to [0011] of the present specification that discusses the formation of a coating film formed on the surface of the electrode. This film appears to be the result of the amount of the carbonic acid ester and not the sulfolane. Therefore, Examiner does not believe that Hatazaki teaches away from the claimed invention.

Applicant argues Hatazaki does not disclose or suggest anything relating to improving safety, while the present invention focuses on the high boiling point of sulfolane. However, Hatazaki discloses less gas is generated in the battery of Hatakai. The use of sulfolane and vinylene carbonate solvents together in a nonaqueous battery containing a negative electrode made of carbon material is disclosed by Hatazaki.

Applicant argues Hatazaki discloses that the amount of the at least one additive is 0.1-10 parts by weight. However, Hatazaki discloses the amount of the at least one additive is 0.1-10 parts by weight of the entire electrolyte (not just the solvent component of the electrolyte). Furthermore, Applicant's comparison of the additive amount of Hatazaki and the claimed amount of sulfolane is improper. One cannot know the volume percentage of sulfolane based on the amount of total solvent contained in the electrolyte of Hatazaki without knowing the entire composition of the electrolyte so that a proper conversion can be calculated. The assertion that the amount of sulfolane of 20-45 vol% as recited in claim 1 is significantly greater than 10 parts

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by weight of sulfolane because the specific gravity of sulfolane is not large is without support. It is unclear how Applicant reaches this assertion. Applicant's arguments are based upon an incorrect comparison of the claimed invention and the prior art of record, thus, the arguments are not persuasive. Furthermore, the claimed invention is prima facie obvious without a showing that the claimed range achieves unexpected results relative to the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

March 30, 2008

/Tracy Dove/

Primary Examiner, Art Unit 1795